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Rabenhorst

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(54) **CURVE CONTOUR SMOOTHING**

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(58) **Field of Search** 345/442, 611, 345/156, 856, 858; 382/242

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,500,927	A *	3/1996	Sander-Cederlof et al.	345/442
5,661,502	A *	8/1997	Cheng	345/856
5,668,894	A *	9/1997	Hamano et al.	382/242
5,933,149	A *	8/1999	Mori et al.	345/442

* cited by examiner

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(57) **ABSTRACT**

A system and method for dramatically reducing the number of vertices defining a polygon on a grid, without significantly changing its effective enclosed area is disclosed. A smoothing process is executed on any general purpose computer system to operate on one or more representations of one or more curves. Each of the curves has a set of a plurality of vertices. The smoothing process first selects a first vertex, a third vertex, and a second middle vertex, the first, second, and third vertices being sequential but not necessarily consecutive on the curve. Then the smoothing process determines the area of a triangle formed by the first, second, and third vertices. This triangular area is compared to a threshold area. If the area is less than the threshold, new vertices are selected along the curve and the process is repeated. However if the area of the triangle is greater than or equal to the threshold, the second (middle) vertex is marked as an important vertex before a new set of vertices is selected. The reduced set of only the important vertices needed may effectively substitute for the complete set when processing the vertices and/or when rendering the curve. This is repeated along the curve until a stop criteria is reached.

21 Claims, 6 Drawing Sheets